AMENDMENTS TO THE CLAIMS:

This listing of the claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

47. (Currently Amended) A method for generating a signal having a frame structure, each frame of said frame structure comprising at least one useful symbol, a guard interval associated to said at least one useful symbol and a reference symbol, said method comprising the step of

performing an amplitude modulation of a bit sequence, ~~the~~an envelope of the amplitude modulated bit sequence defining ~~the~~a reference pattern of said reference symbol; and

inserting, in time domain, the reference symbol into said signal, wherein said reference symbol comprises a real part and an imaginary part, said real part and said imaginary part being equal and being formed by said amplitude modulated bit sequence.

48. (Original) The method according to claim 47, wherein said signal is an orthogonal frequency division multiplexed signal.

49. (Original) The method according to claim 47, wherein said amplitude modulation is performed such that a mean amplitude of said reference symbol substantially corresponds to a mean amplitude of the remaining signal.

50. (Currently Amended) A method for generating a multi-carrier modulated signal having a frame structure, each frame of said frame structure comprising

at least one useful symbol, a guard interval associated to said at least one useful symbol and a reference symbol, said method comprising the steps of:

providing a bitstream;

mapping bits of said bitstream to carriers in order to provide a sequence of spectra;

performing an inverse Fourier transform in order to provide multi-carrier modulated symbols;

associating a guard interval to each multi-carrier modulated symbol;

generating said reference symbol by performing an amplitude modulation of a bit sequence, ~~the~~an envelope of the amplitude modulated bit sequence defining ~~the~~a reference pattern of said reference symbol;

associating said reference symbol to a predetermined number of multi-carrier modulated symbols and associated guard intervals in order to define said frame; and

inserting, in time domain, said reference symbol into said signal, wherein said reference symbol comprises a real part and an imaginary part, said real part and said imaginary part being equal and being formed by said amplitude modulated bit sequence.

51. (Original) The method according to claim 50, wherein said multi-carrier modulated signal is an orthogonal frequency division multiplex signal.

52. (Original) The method according to claim 50, wherein said amplitude modulation is performed such that a mean amplitude of said reference symbol substantially corresponds to a mean amplitude of the remaining multi-carrier modulated signal.

53. (Original) The method according to claim 47, wherein said bit sequence is a pseudo random bit sequence having good autocorrelation characteristics.

54. (Currently Amended) The method according to claim 47, wherein a number of useful symbols in each frame is defined depending on channel properties of a channel through which the signal or ~~the~~a multi-carrier modulated signal is transmitted.

55. (Currently Amended) A method for frame synchronization of a signal having a frame structure, each frame of said frame structure comprising at least one useful symbol, a guard interval associated with said at least one useful symbol and a reference symbol, said reference symbol comprising a real part and an imaginary part, said real part and said imaginary part being equal and being formed by an amplitude modulated bit sequence, said method comprising the steps of:

receiving said signal;

down-converting said received signal;

in time domain, performing an amplitude-demodulation of said down-converted signal in order to generate an envelope;

in time domain, correlating said envelope with a predetermined reference pattern in order to detect ~~the~~a signal reference pattern of said reference symbol in said signal; and

performing said frame synchronization based on the detection of said signal reference pattern.

56. (Original) The method according to claim 55, further comprising the step of performing a fast automatic gain control of said received down-converted signal prior to the step of performing said amplitude-demodulation.

57. (Original) The method according to claim 55, wherein the step of performing said amplitude-demodulation comprises the step of calculating an amplitude of said signal using the $alpha_{max+}$ $beta_{min-}$ method.

58. (Original) The method according to claim 55, further comprising the steps of sampling respective amplitudes of said received down-converted signal and comparing said sampled amplitudes with a predetermined threshold in order to generate a bit sequence in order to perform said amplitude demodulation.

59. (Original) The method according to claim 58, wherein the step of sampling respective amplitudes of said received down-converted signal further comprises the step of performing an over-sampling of said received down-converted signal.

60. (Original) The method according to claim 55, further comprising the step of applying a result of the frame synchronization for a frame in said signal to at

least one subsequent frame in said signal.

61. (Currently Amended) A method for frame synchronization of a multi-carrier modulated signal having frame structure, each frame of said frame structure comprising at least one useful symbol, a guard interval associated to said at least one useful symbol and a reference symbol, said reference symbol comprising a real part and an imaginary part, said real part and said imaginary part being equal and being formed by an amplitude modulated bit sequence, said method comprising the steps of:

receiving said multi-carrier modulated signal;

down-converting said received multi-carrier modulated signal;

in time domain, performing an amplitude-demodulation of said down-converted multi-carrier modulated signal in order to generate an envelope;

in time domain, correlating said envelope with a predetermined reference pattern in order to detect ~~the~~a signal reference pattern of said reference symbol in said multi-carrier modulated signal;

performing said frame synchronization based on the detection of said signal reference pattern;

extracting said reference symbol and said at least one guard interval from said down-converted received multi-carrier modulated signal based on said frame synchronization;

performing a Fourier transform in order to provide a sequence of spectra from said at least one useful symbol; and

de-mapping said sequence of spectra in order to provide a bitstream.

62. (Original) The method according to claim 61, further comprising the step of performing a fast automatic gain control of said received down-converted multi-carrier modulated signal prior to the step of performing said amplitude-demodulation.

63. (Original) The method according to claim 61, wherein the step of performing said amplitude-demodulation comprises the step of calculating an amplitude of said multi-carrier modulated signal using the $alpha_{max+}$ $beta_{min-}$ method.

64. (Original) The method according to claim 61, further comprising the steps of sampling respective amplitudes of said received down-converted multi-carrier modulated signal and comparing said sampled amplitudes with a predetermined threshold in order to generate a bit sequence in order to perform said amplitude demodulation.

65. (Original) The method according to claim 64, wherein the step of sampling respective amplitudes of said received down-converted multi-carrier modulated signal further comprises the step of performing an over-sampling of said received down-converted multi-carrier modulated signal.

66. (Previously Presented) The method according to claim 61, further comprising the step of applying a result of the frame synchronization for a frame in said signal to at least one subsequent frame in said multi-carrier modulated signal.

67. (Original) The method according to claim 55, further comprising the step of detecting a location of said signal reference pattern based on an occurrence of a maximum of a correlation signal when correlating said envelope with said predetermined reference pattern.

68. (Previously Presented) The method according to claim 67, further comprising the steps of:

weighting a plurality of maxima of said correlation signal such that a maximum occurring first is weighted stronger than any subsequently occurring maximum; and

detecting said location of said signal reference pattern based on the greatest one of said weighted maxima.

69. (Original) The method according to claim 68, further comprising the step of:

disabling the step of performing said frame synchronization for a predetermined period of time after having switched-on a receiver performing said method for frame synchronization.

70. (Currently Amended) An apparatus for generating a signal having a frame structure, each frame of said frame structure comprising at least one useful symbol, a guard interval associated to said at least one useful symbol and a reference symbol, said apparatus comprising:

an amplitude modulator for performing an amplitude modulation of a bit

sequence, ~~the~~an envelope of the amplitude modulated bit sequence defining ~~the~~a reference pattern of said reference symbol; and

means for inserting, in time domain, the reference symbol into said signal, wherein said reference symbol comprises a real part and an imaginary part, said real part and said imaginary part being equal and being formed by said amplitude modulated bit sequence.

71. (Original) The apparatus according to claim 70, wherein said signal is an orthogonal frequency division multiplexed signal.

72. (Original) The apparatus according to claim 70, wherein a mean amplitude of said reference symbol substantially corresponds to a mean amplitude of the remaining signal.

73. (Currently Amended) An apparatus for generating a multi-carrier modulated signal having a frame structure, each frame of said frame structure comprising at least one useful symbol, a guard interval associated to said at least one useful symbol and a reference symbol, said apparatus comprising:

means for providing a bitstream;

means for mapping bits of said bitstream to carriers in order to provide a sequence of spectra;

means for performing an inverse Fourier transform in order to provide multi-carrier modulated symbols;

means for associating a guard interval to each multi-carrier modulated symbol;

means for generating said reference symbol comprising an amplitude modulator for performing an amplitude modulation of a bit sequence, ~~the~~an envelope of the amplitude modulated bit sequence defining ~~the~~a reference pattern of said reference symbol;

means for associating said reference symbol to a predetermined number of multi-carrier modulated symbols and associated guard intervals in order to define said frame; and

means for inserting, in time domain, the reference symbol into said signal, wherein said reference symbol comprises a real part and an imaginary part, said real part and said imaginary part being equal and being formed by said amplitude modulated bit sequence.

74. (Original) The apparatus according to claim 73, wherein said multi-carrier modulated signal is an orthogonal frequency division multiplex signal.

75. (Currently Amended) The apparatus according to claim ~~72~~73, wherein said means for generating said reference symbol performs the amplitude modulation such that a mean amplitude of said reference symbol substantially corresponds to a mean amplitude of the remaining multi-carrier modulated signal.

76. (Currently Amended) The apparatus according to claim ~~70~~73, wherein said means for generating said reference symbol generates a pseudo random bit sequence having good autocorrelation characteristics as said bit sequence.

77. (Currently Amended) The apparatus according to claim 70, comprising means for determining a number of useful symbols in each frame depending on channel properties of a channel through which the signal or ~~the~~a multi-carrier modulated signal is transmitted.

78. (Currently Amended) An apparatus for frame synchronization of a signal having a frame structure, each frame of said frame structure comprising at least one useful symbol, a guard interval associated to said at least one useful symbol and a reference symbol, said reference symbol comprising a real part and an imaginary part, said real part and said imaginary part being equal and being formed by an amplitude modulated bit sequence, said apparatus comprising:

receiving means for receiving said signal;

a down-converter for down-converting said received signal;

an amplitude-demodulator for performing, in ~~the~~ time domain, an amplitude demodulation of said down-converted signal in order to generate an envelope;

a correlator for correlating, in time domain, said envelope with a predetermined reference pattern in order to detect ~~the~~a signal reference pattern of said reference symbol in said signal; and

means for performing said frame synchronization based on the detection of said signal reference pattern.

79. (Original) The apparatus according to claim 78, further comprising means for performing a fast automatic gain control of said received down-converted signal preceding said amplitude-demodulator.

80. (Original) The apparatus according to claim 78, wherein said amplitude-demodulator comprises means for calculating an amplitude of said signal using the $alpha_{max+}$ $beta_{min-}$ method.

81. (Original) The apparatus according to claim 78, further comprising means for sampling respective amplitudes of said received down-converted signal, wherein said amplitude-demodulator comprises means for comparing said sampled amplitudes with a predetermined threshold in order to generate a bit sequence.

82. (Original) The apparatus according to claim 81, wherein said means for sampling comprises means for over-sampling said received down-converted signal.

83. (Original) The apparatus according to claim 78, further comprising means for applying a result of the frame synchronization for a frame in said signal to at least one subsequent frame in said signal.

84. (Currently Amended) An apparatus for frame synchronization of a multi-carrier modulated signal having a frame structure, each frame of said frame structure comprising at least one useful symbol, a guard interval associated to said at least one useful symbol and a reference symbol, said reference symbol comprising a real part and an imaginary part, said real part and said imaginary part being equal and being formed by an amplitude modulated bit sequence,

said apparatus comprising:

a receiver for receiving said multi-carrier modulated signal;

a down-converter for down-converting said received multi-carrier modulated signal;

an amplitude-demodulator for performing, in the time domain, an amplitude-demodulation of said down-converted multi-carrier modulated signal in order to generate an envelope;

a correlator for correlating, in the time domain, said envelope with a predetermined reference pattern in order to detect ~~the~~a signal reference pattern of said reference symbol in said multi-carrier modulated signal;

means for performing said frame synchronization based on the detection of said signal reference pattern;

means for extracting said reference symbol and said at least one guard interval from said down-converted received multi-carrier modulated signal based on said frame synchronization in order to generate said at least one useful symbol;

means for performing a Fourier transform in order to provide a sequence of spectra from said at least one useful symbol; and

means for de-mapping said sequence of spectra in order to provide a bitstream.

85. (Original) The apparatus according to claim 84, further comprising means for

performing a fast automatic gain control of said received down-converted multi-carrier modulated signal preceding said amplitude-demodulator.

86. (Original) The apparatus according to claim 84, wherein said amplitude-demodulator comprises means for calculating an amplitude of said multi-carrier modulated signal using the $alpha_{max+}$ $beta_{min-}$ method.

87. (Original) The apparatus according to claim 84, further comprising means for sampling respective amplitudes of said received down-converted multi-carrier modulated signal, wherein said amplitude-demodulator comprises means for comparing said sampled amplitudes with a predetermined threshold in order to generate a bit sequence.

88. (Original) The apparatus according to claim 87, wherein said means for sampling comprises means for over-sampling said received down-converted multi-carrier modulated signal.

89. (Original) The apparatus according to claim 84, further comprising means for applying a result of the frame synchronization for a frame in said multi-carrier modulated signal to at least one subsequent frame in said multi-carrier modulated signal.

90. (Original) The apparatus according to claim 78, further comprising means for detecting a location of said signal reference pattern based on an occurrence of a maximum of a correlation signal output of said correlator.

91. (Original) The apparatus according to claim 90, further comprising means for weighting a plurality of maxima of said correlation signal such that a

maximum occurring first is weighted stronger than any subsequently occurring maximum; and

means for detecting said location of said signal reference pattern based on the greatest one of said weighted maxima.

92. (Original) The apparatus according to claim 91, further comprising means for disabling said means for performing said frame synchronization for a predetermined period of time after having switched-on a receiver comprising said apparatus for frame synchronization.